

SYSTEMS AND METHODS FOR FLUID DELIVERY

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] The present application is a Continuation of U.S. patent application Ser. No. 12/560,102, filed Sep. 15, 2009 and entitled System and Methods for Fluid Delivery, now U.S. Pat. No. 10,010,669, issued Jul. 3, 2018 (Docket No. H65), which is a Non-Provisional application which claims priority from U.S. Provisional Patent Application Ser. No. 61/097,021, filed Sep. 15, 2008 and entitled Systems and Methods for Fluid Delivery (Docket No. F72); U.S. Provisional Patent Application Ser. No. 61/101,053, filed Sep. 29, 2008 and entitled Infusion Pump Assembly with a Switch Assembly (Docket No. F73); U.S. Provisional Patent Application Ser. No. 61/101,077, filed Sep. 29, 2008 and entitled Infusion Pump Assembly with Tubing Storage (Docket No. F74); U.S. Provisional Patent Application Ser. No. 61/101,105, filed Sep. 29, 2008 and entitled Improved Infusion Pump Assembly (Docket No. F75); U.S. Provisional Patent Application Ser. No. 61/101,115, filed Sep. 29, 2008 and entitled Filling Apparatus and Methods for an Infusion Pump Assembly (Docket No. G08); U.S. Provisional Patent Application Ser. No. 61/141,996, filed Dec. 31, 2008 and entitled Acoustic Volume Sensing Methods, Systems and Apparatus (Docket No. G07); and U.S. Provisional Patent Application Ser. No. 61/141,781, filed Dec. 31, 2008 and entitled Split Ring Resonator Antenna Adapted for Use in Wirelessly Controlled Medical Device (Docket No. G81), all of which are hereby incorporated herein by reference in their entirety.

[0002] U.S. patent application Ser. No. 12/560,102, is also a Continuation in Part of U.S. patent application Ser. No. 11/704,899, filed Feb. 9, 2007 and entitled Fluid Delivery Systems and Methods, now U.S. Pat. No. 8,414,522, issued Apr. 9, 2013 (Docket No. E70), which is a non-provisional of U.S. Provisional Patent Application Ser. No. 60/772,313, filed Feb. 9, 2006, and entitled Portable Injection System (Docket No. E42), U.S. Provisional Patent Application Ser. No. 60/789,243, filed Apr. 5, 2006 and entitled Method of Volume Measurement for Flow Control (Docket No. E53), and U.S. Provisional Patent Application Ser. No. 60/793,188, filed Apr. 19, 2006, and entitled Portable Injection and Adhesive System (Docket No. E46), which are hereby incorporated herein by reference in their entirety.

[0003] U.S. patent application Ser. No. 12/560,102, present application is also a Continuation in Part of U.S. patent application Ser. No. 11/704,896, filed Feb. 9, 2007 and entitled Pumping Fluid Delivery Systems and Methods Using Force Application Assembly, now U.S. Pat. No. 8,585,377, issued Nov. 19, 2013 (Docket No. E71), which is a non-provisional of U.S. Provisional Patent Application Ser. No. 60/772,313, filed Feb. 9, 2006 and entitled Portable Injection System (Docket No. E42), U.S. Provisional Patent Application Ser. No. 60/789,243, filed Apr. 5, 2006 and Method of Volume Measurement for Flow Control (Docket No. E53), and U.S. Provisional Patent Application Ser. No. 60/793,188, filed Apr. 19, 2006, and entitled Portable Injection and Adhesive System (Docket No. E46), which are hereby incorporated herein by reference in their entirety.

[0004] U.S. patent application Ser. No. 12/560,102, is also a Continuation in Part of U.S. patent application Ser. No. 11/704,886 (Docket No. E72), filed Feb. 9, 2007 and entitled

Patch-Sized Fluid Delivery Systems and Methods, now U.S. Pat. No. 8,545,445, issued Oct. 1, 2013, which is a non-provisional of U.S. Provisional Patent Application Ser. No. 60/772,313, filed Feb. 9, 2006 and entitled Portable Injection System (Docket No. E42); U.S. Provisional Patent Application Ser. No. 60/789,243, filed Apr. 5, 2006 and entitled Method of Volume Measurement for Flow Control" (Docket No. E53); and U.S. Provisional Patent Application Ser. No. 60/793,188, filed Apr. 19, 2006 and entitled Portable Injection and Adhesive System (Docket No. E46), which are hereby incorporated herein by reference in their entirety.

[0005] U.S. patent application Ser. No. 12/560,102, is also a Continuation in Part of U.S. patent application Ser. No. 11/704,897, filed Feb. 9, 2007 and entitled Adhesive and Peripheral Systems and Methods for Medical Devices, now U.S. Pat. No. 8,113,244, issued Feb. 14, 2012 (Docket No. E73), which is a non-provisional of U.S. Provisional Patent Application Ser. No. 60/772,313, filed Feb. 9, 2006 and entitled Portable Injection System (Docket No. E42); U.S. Provisional Patent Application Ser. No. 60/789,243, filed Apr. 5, 2006 and entitled Method of Volume Measurement for Flow Control (Docket No. E53); and U.S. Provisional Patent Application Ser. No. 60/793,188, filed Apr. 19, 2006 and entitled "Portable Injection and Adhesive System" (Docket No. E46), which are hereby incorporated herein by reference in their entirety.

TECHNICAL FIELD

[0006] The present invention relates to the delivery of a fluid and more particularly, to systems and methods for fluid delivery.

BACKGROUND INFORMATION

[0007] Millions of people live with diabetes mellitus. These patients are further commonly classified into one of two types of diabetes, Type I and Type II. Type I, historically referred to as Juvenile Diabetes, is an autoimmune disease, and is characterized by the inability to secrete insulin. Type II is a disease that compromises the ability to respond to insulin and/or produce enough insulin. Both types of diabetes are characterized by hyperglycemia. Patient's living with Type I diabetes require multiple injections of insulin, a hormone that lowers blood glucose levels, everyday to survive. However, to maintain long-term health people living with diabetes strive to maintain as close to a "non-diabetic" blood glucose level as possible. Maintaining a healthy blood glucose level, however, is a very difficult goal to achieve.

[0008] To this end, there have been efforts to design portable devices, e.g. insulin pumps, for the controlled release of insulin. There are many different forms of insulin available. Most patients using an insulin pump currently use U-100 insulin rapid-acting insulin (e.g., HUMALOG insulin lispro injection or the like) in the pump. Insulin pump devices are known to have a reservoir such as a cartridge, syringe, or bag, and to be electronically controlled. However, the delivery rates must be manually entered by the person living with diabetes or a caregiver of that person. Thus, the diabetic patient determines/dictates the amount of insulin delivered for any given time/period of time (i.e., the "basal" and "bolus" rate/amount) using information or factors available to them, for example, their blood glucose readings determined using a blood glucose meter, past data